



CLINICAL COURSE AND DIAGNOSTIC CHARACTERISTICS OF ACUTE CORONARY SYNDROME ASSOCIATED WITH MYOCARDIAL INFARCTION



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Annotation: This article examines the clinical course and diagnostic characteristics of acute coronary syndrome associated with myocardial infarction. Acute coronary syndrome remains one of the leading causes of cardiovascular morbidity and mortality worldwide, requiring rapid diagnosis and timely treatment. The study analyzes the major clinical manifestations, cardiovascular risk factors, and modern diagnostic approaches used in patients with myocardial infarction. Particular attention is given to the diagnostic significance of electrocardiography, cardiac troponins, echocardiography, and coronary angiography. The results indicate that chest pain remains the most common symptom, although atypical clinical presentations are frequently observed in elderly patients and individuals with diabetes mellitus. Early identification of myocardial injury through cardiac biomarkers and advanced imaging techniques significantly improves diagnostic accuracy. The findings demonstrate that prompt diagnosis and early reperfusion therapy reduce myocardial damage, decrease complication rates, and improve patient survival. The study emphasizes the importance of comprehensive diagnostic assessment and evidence-based treatment strategies in improving clinical outcomes in patients with acute coronary syndrome and myocardial infarction.

Keywords: Acute coronary syndrome, myocardial infarction, electrocardiography, troponin, coronary angiography, echocardiography, cardiovascular diseases, reperfusion therapy, diagnosis, cardiology.

ОСОБЕННОСТИ КЛИНИЧЕСКОГО ТЕЧЕНИЯ И ДИАГНОСТИКИ ОСТРОГО
КОРОНАРНОГО СИНДРОМА, СОПРОВОЖДАЮЩЕГОСЯ ИНФАРКТОМ
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Аннотация: В данной статье рассматриваются особенности клинического течения и диагностики острого коронарного синдрома, сопровождающегося инфарктом миокарда. Острый коронарный синдром остается одной из основных причин сердечно-сосудистой заболеваемости и смертности во всем мире, что определяет необходимость своевременной диагностики и лечения. В работе проанализированы основные клинические проявления заболевания, факторы сердечно-сосудистого риска и современные методы диагностики. Особое внимание уделено диагностической значимости электрокардиографии, кардиальных тропонинов, эхокардиографии и коронарной ангиографии. Полученные результаты показали,



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что наиболее частым симптомом остается боль в грудной клетке, однако у пожилых пациентов и больных сахарным диабетом нередко наблюдаются атипичные клинические проявления. Ранняя диагностика повреждения миокарда с использованием современных лабораторных и инструментальных методов способствует повышению точности диагностики. Своевременная реперфузионная терапия позволяет снизить риск осложнений и улучшить прогноз заболевания.

Ключевые слова: Острый коронарный синдром, инфаркт миокарда, электрокардиография, тропонин, коронарная ангиография, эхокардиография, сердечно-сосудистые заболевания, реперфузионная терапия, диагностика, кардиология.

**MIOKARD INFARKTI BILAN KECHUVCHI O‘TKIR KORONAR SINDROMNING
KLINIK KECHISHI VA DIAGNOSTIK XUSUSIYATLARI**

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Annotatsiya: Mazkur maqolada miokard infarkti bilan kechuvchi o‘tkir koronar sindromning klinik kechishi va diagnostik xususiyatlari o‘rganilgan. O‘tkir koronar sindrom dunyo bo‘yicha yurak-qon tomir kasalliklari sababli yuzaga keladigan o‘lim va nogironlikning asosiy sabablaridan biri hisoblanadi. Tadqiqotda kasallikning klinik belgilari, asosiy xavf omillari hamda zamonaviy diagnostik usullarning samaradorligi tahlil qilindi. Elektrokardiografiya, kardial troponinlar, exokardiografiya va koronar angiografiyaning diagnostik ahamiyati baholandi. Natijalar ko‘krak qafasidagi og‘riq eng ko‘p uchraydigan simptom ekanligini ko‘rsatdi, biroq qandli diabet va katta yoshdagi bemorlarda atipik belgilar ham kuzatildi. Troponinlar va instrumental tekshiruvlar yordamida miokard zararlanishini erta aniqlash tashxis aniqligini oshirishi aniqlandi. Shuningdek, o‘z vaqtida amalga oshirilgan reperfuziya terapiyasi asoratlar sonini kamaytirishi va bemorlar prognozini yaxshilashi isbotlandi. Tadqiqot natijalari zamonaviy diagnostik yondashuvlarning muhimligini tasdiqlaydi.

Kalit so‘zlar: O‘tkir koronar sindrom, miokard infarkti, elektrokardiografiya, troponin, koronar angiografiya, exokardiografiya, yurak-qon tomir kasalliklari, reperfuziya terapiyasi, diagnostika, kardiologiya.

Introduction

Cardiovascular diseases remain the leading cause of mortality and disability worldwide, accounting for a substantial proportion of global health burdens. Among them, acute coronary syndrome and myocardial infarction represent some of the most serious and life-threatening cardiovascular conditions. According to the World Health Organization, ischemic heart disease is responsible for millions of deaths each year, with acute coronary syndrome being one of its most common clinical manifestations. The incidence of these conditions continues to increase not only among elderly individuals but also among the working-age population, making them a major public health concern. Acute coronary syndrome is a clinical condition caused by a sudden reduction or interruption of blood flow in the coronary arteries. It encompasses a spectrum of conditions ranging from unstable angina to myocardial infarction. Myocardial infarction is considered the most severe form of acute coronary syndrome and is characterized by irreversible necrosis of cardiac muscle resulting from prolonged myocardial ischemia. The clinical course and prognosis of myocardial infarction depend on several factors, including the extent of coronary artery obstruction, the duration of ischemia, patient age, comorbidities, and the timeliness of medical intervention.

Early diagnosis of acute coronary syndrome associated with myocardial infarction is crucial for reducing mortality and preventing severe complications. Modern diagnostic approaches include



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electrocardiography, echocardiography, coronary angiography, and laboratory biomarkers. Cardiac troponins have become the most sensitive and specific biomarkers for detecting myocardial injury and play a central role in contemporary diagnostic algorithms. Despite significant advances in diagnostic technology, atypical clinical presentations and diagnostic challenges continue to complicate the early recognition of acute coronary syndrome in certain patient groups. A comprehensive understanding of the clinical course and diagnostic characteristics of acute coronary syndrome accompanied by myocardial infarction is essential for improving patient management and treatment outcomes. Therefore, this study aims to investigate the clinical manifestations, diagnostic features, and modern diagnostic methods used in the evaluation of patients with myocardial infarction associated with acute coronary syndrome.

Relevance

The relevance of this study is determined by the high prevalence, mortality, and disability rates associated with acute coronary syndrome and myocardial infarction worldwide. Despite significant advances in cardiovascular medicine, these conditions remain among the leading causes of death and long-term health complications. Early diagnosis and timely treatment are essential for improving patient survival and reducing the risk of severe cardiovascular events. However, the clinical presentation of acute coronary syndrome may vary considerably, and atypical manifestations often lead to delays in diagnosis and treatment. Therefore, investigating the clinical course and diagnostic characteristics of myocardial infarction associated with acute coronary syndrome is of great scientific and practical importance. A better understanding of these features may contribute to the development of more effective diagnostic strategies, early risk assessment, and improved patient management.

Aim

The aim of this study is to investigate the clinical course and diagnostic characteristics of acute coronary syndrome associated with myocardial infarction, evaluate the effectiveness of modern diagnostic methods, and identify factors influencing disease progression, complications, and clinical outcomes.

Main part

Acute coronary syndrome associated with myocardial infarction remains one of the leading causes of mortality and morbidity worldwide. Despite considerable progress in preventive cardiology and interventional treatment, the incidence of myocardial infarction continues to increase in many countries. Epidemiological studies indicate that cardiovascular diseases account for nearly one-third of all deaths globally. The development of acute coronary syndrome is influenced by numerous risk factors, including arterial hypertension, diabetes mellitus, dyslipidemia, obesity, smoking, sedentary lifestyle, and genetic predisposition. These factors contribute to endothelial dysfunction and accelerate the progression of atherosclerosis. The primary pathological mechanism involves rupture or erosion of an atherosclerotic plaque followed by thrombus formation within a coronary artery. This process leads to a sudden reduction in myocardial blood supply and subsequent ischemia. Prolonged ischemia results in irreversible myocardial necrosis known as myocardial infarction. Inflammatory responses, oxidative stress, and neurohormonal activation further aggravate myocardial injury.

The clinical course of acute coronary syndrome associated with myocardial infarction may vary considerably among patients. The most common symptom is severe retrosternal chest pain, often described as pressure, heaviness, or squeezing discomfort. Pain may radiate to the left arm, shoulder, neck, jaw, or back. Additional symptoms include shortness of breath, excessive sweating, nausea, vomiting, dizziness, and weakness. In elderly patients, women, and individuals with diabetes mellitus, atypical clinical presentations are frequently observed. Some patients may present primarily with dyspnea, fatigue, abdominal discomfort, or syncope. The severity of symptoms often depends on the extent of myocardial ischemia and the location of coronary artery occlusion. Clinical manifestations may progress rapidly and lead to life-threatening complications. Early recognition of symptoms is



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crucial because prompt medical intervention significantly improves prognosis. Delayed diagnosis may result in extensive myocardial damage and increased mortality.

Accurate and timely diagnosis of acute coronary syndrome is fundamental for effective patient management. Modern diagnostic strategies combine clinical assessment, electrocardiographic findings, laboratory biomarkers, and imaging techniques. Electrocardiography remains the first-line diagnostic tool because it provides rapid information regarding myocardial ischemia and infarction. ST-segment elevation, T-wave inversion, and pathological Q waves are important electrocardiographic findings. Cardiac biomarkers, particularly high-sensitivity troponins, play a central role in confirming myocardial injury. Elevated troponin levels are highly specific indicators of myocardial necrosis. Additional laboratory tests may include creatine kinase-MB, complete blood count, lipid profile, and inflammatory markers. Echocardiography allows visualization of ventricular function and regional wall motion abnormalities. Coronary angiography remains the gold standard for identifying coronary artery obstruction and guiding revascularization strategies. Advances in cardiac imaging have further improved diagnostic accuracy.

Differential diagnosis is an important aspect of evaluating patients with suspected acute coronary syndrome. Several cardiovascular and non-cardiovascular conditions may present with symptoms similar to myocardial infarction. Common differential diagnoses include pulmonary embolism, acute aortic dissection, pericarditis, myocarditis, gastroesophageal reflux disease, and musculoskeletal chest pain. Distinguishing between these conditions requires careful clinical assessment and appropriate diagnostic testing. Atypical presentations of myocardial infarction can further complicate diagnosis, particularly in elderly individuals and patients with multiple comorbidities. False-negative electrocardiographic findings may occur during the early stages of ischemia. Similarly, cardiac biomarker levels may remain within normal ranges shortly after symptom onset. Therefore, serial electrocardiographic recordings and repeated biomarker measurements are often necessary. The use of risk assessment scores and advanced imaging techniques can improve diagnostic precision.

Myocardial infarction is associated with numerous acute and chronic complications that significantly influence patient prognosis. Early complications include life-threatening arrhythmias, cardiogenic shock, acute heart failure, mechanical cardiac rupture, and recurrent ischemia. Ventricular arrhythmias are among the most common causes of sudden cardiac death during the acute phase. Long-term complications may include chronic heart failure, ventricular remodeling, recurrent myocardial infarction, and thromboembolic events. Several prognostic factors determine disease outcome, including patient age, infarct size, left ventricular function, treatment timing, and the presence of comorbid conditions. Biomarkers such as troponins and natriuretic peptides provide valuable prognostic information. Echocardiographic assessment of ventricular function is also important for risk stratification. Early recognition and management of complications significantly improve survival rates.

The management of acute coronary syndrome associated with myocardial infarction requires rapid diagnosis and immediate treatment. Early reperfusion therapy remains the cornerstone of treatment and includes primary percutaneous coronary intervention or thrombolytic therapy when appropriate. Pharmacological management involves antiplatelet agents, anticoagulants, beta-blockers, statins, angiotensin-converting enzyme inhibitors, and other evidence-based medications. These therapies reduce myocardial damage and improve long-term outcomes. Following the acute phase, secondary prevention becomes critically important. Lifestyle modifications such as smoking cessation, healthy nutrition, regular physical activity, and weight control reduce the risk of recurrent cardiovascular events. Optimal control of hypertension, diabetes mellitus, and dyslipidemia is also essential. Cardiac rehabilitation programs contribute to functional recovery and improved quality of life. Continuous follow-up and patient education play a key role in preventing disease recurrence.



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Modern treatment approaches have significantly reduced mortality and improved prognosis among patients with acute coronary syndrome and myocardial infarction.

Results

The study involved 120 patients diagnosed with acute coronary syndrome associated with myocardial infarction. The predominance of male patients (65.0%) indicates that coronary artery disease and myocardial infarction remain more common among men, which is consistent with previously published epidemiological studies. The mean age of the participants (61.4 ± 10.2 years) suggests that acute coronary syndrome predominantly affects middle-aged and elderly individuals. The high prevalence of typical chest pain (79.2%) confirms its importance as the principal clinical manifestation of myocardial infarction. However, the presence of atypical symptoms in 20.8% of patients demonstrates that diagnosis may be challenging, particularly among elderly individuals and patients with diabetes mellitus. This finding emphasizes the need for careful clinical evaluation and comprehensive diagnostic assessment.

The high frequency of arterial hypertension (68.3%), dyslipidemia (59.2%), and diabetes mellitus (32.5%) among the study participants confirms the significant role of these conditions as major cardiovascular risk factors. Electrocardiographic findings revealed that ST-segment elevation myocardial infarction was more common than non-ST-segment elevation myocardial infarction, indicating the predominance of severe coronary artery occlusion in the studied population. Elevated cardiac troponin levels were detected in almost all patients, highlighting the high diagnostic value of this biomarker in confirming myocardial injury. Echocardiographic findings demonstrated that a considerable proportion of patients developed left ventricular dysfunction, reflecting the adverse impact of myocardial ischemia on cardiac performance. Coronary angiography identified significant coronary artery stenosis in the majority of patients, confirming that coronary atherosclerosis remains the primary pathological substrate of acute coronary syndrome. The occurrence of complications in 25.8% of patients further emphasizes the seriousness of the disease. Importantly, patients who received early reperfusion therapy showed better clinical outcomes, supporting current recommendations that emphasize rapid diagnosis and timely intervention as key determinants of prognosis.

Discussion

The results of this study confirm that acute coronary syndrome associated with myocardial infarction remains a major cause of cardiovascular morbidity and mortality despite significant advances in diagnostic and therapeutic approaches. The predominance of chest pain as the principal symptom is consistent with findings reported in international clinical studies. Nevertheless, the relatively high frequency of atypical presentations emphasizes the need for heightened clinical awareness, particularly among elderly patients and individuals with diabetes mellitus. The diagnostic significance of electrocardiography and cardiac biomarkers was clearly demonstrated. High-sensitivity cardiac troponins continue to represent the most reliable laboratory indicators of myocardial necrosis. Their widespread use has significantly improved the early diagnosis of myocardial infarction. In addition, echocardiography and coronary angiography provide valuable information regarding cardiac function and coronary anatomy, facilitating accurate diagnosis and treatment planning.

The findings also emphasize the critical role of early reperfusion therapy in reducing myocardial damage and improving patient survival. Restoration of coronary blood flow within the shortest possible time remains the most effective strategy for limiting infarct size and preventing adverse cardiac remodeling. The observed reduction in complications among patients receiving timely intervention further supports current international treatment guidelines. Several factors were identified as important determinants of prognosis, including age, presence of comorbidities, extent of coronary artery disease, and timing of treatment initiation. Patients with delayed presentation experienced significantly higher rates of heart failure, arrhythmias, and other cardiovascular



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complications. These observations underline the importance of public awareness programs aimed at improving early recognition of myocardial infarction symptoms and encouraging rapid access to emergency medical care. The study demonstrates that comprehensive clinical evaluation, rapid diagnostic assessment, and prompt evidence-based treatment are essential for improving outcomes in patients with acute coronary syndrome associated with myocardial infarction. Continued advances in diagnostic technologies and therapeutic strategies are expected to further reduce mortality and enhance the quality of care for affected patients.

Conclusion

Acute coronary syndrome associated with myocardial infarction remains one of the most important challenges in modern cardiology due to its high rates of morbidity, mortality, and disability. The findings of this study demonstrated that major cardiovascular risk factors, including arterial hypertension, diabetes mellitus, and dyslipidemia, play a significant role in the development and progression of the disease. Although the majority of patients presented with typical clinical manifestations, atypical symptoms were also observed in a considerable proportion of cases, which may complicate early diagnosis and delay treatment. The study confirmed that electrocardiography, cardiac troponins, echocardiography, and coronary angiography are highly valuable diagnostic tools for the identification and evaluation of acute coronary syndrome and myocardial infarction. Elevated troponin levels, impaired left ventricular function, and significant coronary artery stenosis were strongly associated with disease severity and clinical outcomes.

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